

Principles of Environmental Restoration

Principle 3 – Early Identification of Likely Response Actions

Principle 3

Early identification of likely response actions is possible, prudent, and necessary

- Session objectives:
 - Explain importance of early identification of response options
 - Explain how to integrate early and interim actions into environmental restoration planning

Key concept - Problems, by definition, require a response. Identifying which response options are best, or likely to be the best, therefore, is a major activity once conditions are determined to be a problem. Moreover, since a completed decision rule includes the likely response, responses must be identified early

Once problems are defined, likely response actions need to be identified to establish an early focus on a remediation strategy and data needs to evaluate technologies. This does not preclude a broad technology evaluation, nor less consideration of innovative approaches. Rather, it seeks early consensus on the likely range of potential solutions, including innovative possibilities.

Eliminating less viable response options early eliminates unnecessary analyses and documentation, and, therefore, saves time. Time is a yardstick of problem remediation; public confidence can decline and risks can increase over time with inaction

Reasons for a bias for action:

- reduces risk
- increases public confidence
- decreases cost by eliminating unnecessary activities

In addition to a technical evaluation of approaches, regulatory authorities must be evaluated to determine which authorities are most likely to be available

Early identification of likely response actions allows:

- Early focus on appropriate remedial action objectives
- Early consideration of potential response action implications
- Development of a hierarchy of probable technologies for a defined problem
- Early consideration of presumptive remedies and generic approaches and a phased response to remediation
- Scope of decision documents, balancing between broad objectives and well defined criteria

For many situations, there is a clear hierarchy of probable technologies

Early identification and communication of response actions can streamline

- Workplan development
- Sampling and analysis needs
- Technology evaluation
- Documentation
- Design

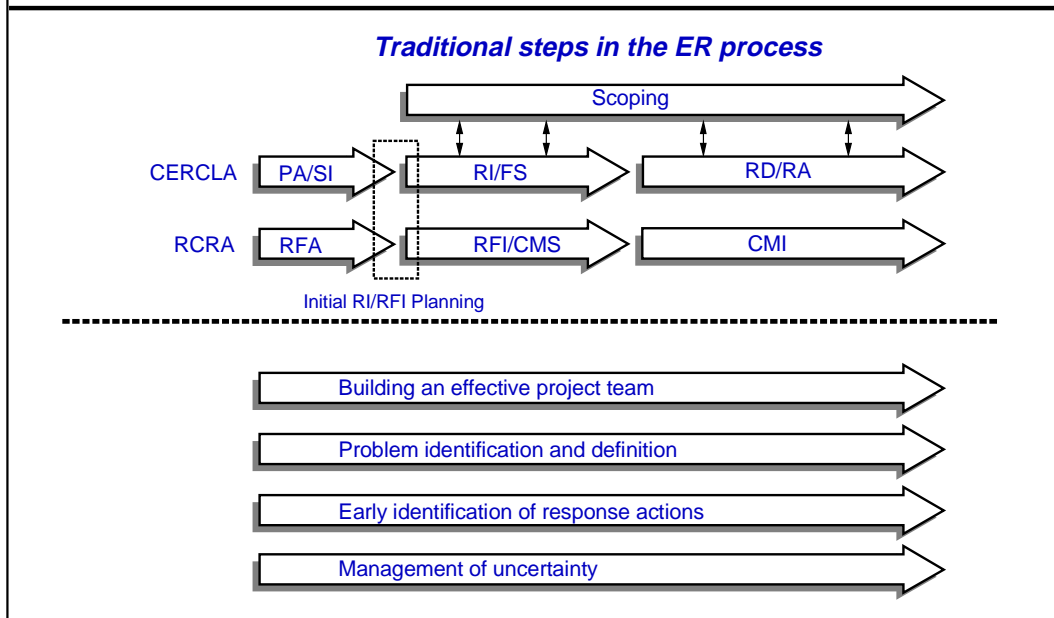
There are well established approaches for the range of contamination such as for VOCs in soils, PCBs, groundwater, and landfills. These should be the first sources evaluated to identify what decisions a site must make regarding technology and what data are needed, if any, to make these decisions

DOE is developing standard approaches for a range of problems

EPA's VOCs in Soil Presumptive Remedy Decision Logic on the opposite page is an example of information about preferred technologies that for many problems already exists

Decision documents should ideally represent a balance between narrowly defined selection criteria and a broad scope. This satisfies the needs of both the public in their need to understand and participate in the decision process, as well as the need to provide enough flexibility to encourage innovation in the final remedial approach.

Timing



The core team is responsible for advancing the project through all phases of the environmental restoration process

The problem is continuously refined as new data becomes available

Selected response actions may be amenable to streamlining opportunities during design and implementation

Uncertainties at every decision point must be reduced to acceptable levels and/or managed through contingency planning

Focus on identifying likely response actions

- Technical
 - Identifying a hierarchy of probable technologies
 - Identifying fatal flaws for any of the probable technologies
 - Identifying cost saving opportunities through innovations
- Regulatory
 - Identifying appropriate implementation authorities
 - Identifying how to phase response actions to optimize project schedules

An example hierarchy of probable technologies is shown on the facing page. Developing a hierarchy of probable technologies is the technical part of the evaluation. Information needed to identify a hierarchy includes:

- What technologies have worked on similar problems in the past?
- What are the technical factors that make these technologies succeed or fail?
- What are factors at the site that would lead to technology success or failure?

Identifying potential innovations often requires a literature review, use of experts, and accessing programs that make innovative technology information available

Identify whether to adopt a phased approach to remediation is a key regulatory consideration:

- Aggressively uses all response authorities in a sequence that optimizes the remediation of problems
- Integrates CERCLA removal and remedial or, RCRA interim and final actions, based on the scope of the problem, the uncertainties that exist, degree of risk reduction achieved or needed, and whether site characterization is done

Basis for prioritizing technologies

- Presumptive remedies
- Characteristic uncertainties
- Cost-effectiveness profile
- Public acceptance
- Ability to understand and manage uncertainties associated with technology

Where presumptive remedies exist, use that information to establish a hierarchy

How manageable are uncertainties in using a technology, given site conditions and cleanup objectives?

Under what conditions are technologies cost-effective?

What are stakeholder viewpoints on a technology's use (including internal stakeholders in non-environmental restoration programs)?

Identifying response actions is iterative

- Initiate in scoping as problems are defined
- Re-evaluate as a part of the continual refinement and transition of the problem statement to a close-out report
- Where appropriate, evaluate across operable units/sites to identify innovation/integration opportunities

Identifying response action is done in scoping, characterization and assessment, and evaluation phases of an RI/FS, remedy design (through value engineering), and remedy implementation (through system integration)

Where applicable, likely response actions should be evaluated at all three levels of environmental restoration projects:

•Sitewide: What are overall capacity and technology issues for the site? Have certain technologies already been procured or are they available through existing on-site capacity?

•Operable Unit: What is the combination of technologies to adequately address problems within an operable unit?

•Individual problem: What is the most appropriate technology for each specific problem identified?

Response action design

- Response action design can be initiated early *if*:
 - A presumptive remedy or obvious solution exists
 - A phased approach is used, i.e., removal, interim, or early actions are appropriate
 - Data needs can be met as easily during design as during characterization phase
 - Uncertainties can be managed during the response
 - Core team reaches consensus

Under many circumstances, response action design can be initiated early on, and information about the design can be included in remedy decision documents

A coordinated approach to using early response actions is what EPA calls a phased approach to remediation. DOE's Phased Response / Early Action Guidance (DOE/EH-0506) describes options and appropriate conditions for using removal, interim, and early actions in a coordinated manner with final response actions. Phased responses are almost always appropriate for problems posing substantial risks or where obvious solutions exist for problems

Is a phased response appropriate for any of the problems defined in the hypothetical example illustrated on the next page?

- Underground storage tank releasing TCE and Tc-99 to the environment
- TCE and Tc-99 released to subsurface soils in excess of regulatory criteria
- Free-liquid phase and dissolved-phase plumes exceed ground water cleanup levels of 5 ppb TCE and 300 pCi/L Tc-99.